

VII. LIST OF SPECIES AND DESCRIPTION OF NEW
MATERIAL FROM THE DUCHESNE RIVER
OLIGOCENE, UINTA BASIN, UTAH.

BY O. A. PETERSON*

The mammalian fossil fauna indicated in the following list appears, on the whole, to present a transition, remarkably well along in its modernization, from the Upper Eocene to the lower Oligocene of other localities in America. While there is present in this horizon the evidence of archaic carnivorous mammals (*Hessolestes*), the progress in the development toward the more modernized lower Oligocene mammalia of this new fauna, as now known, is well marked. In comparing the age of the Duchesne River Oligocene with the European Tertiary horizons, it agrees best perhaps with the lignite deposits of France and Italy. Scott¹ has already placed this new American horizon with the Cadibona (Ligurian) series of Italy.

LIST OF SPECIES

REPTILIA

TESTUDINATA

Cymatholcus longus Clark

CROCODILIA

Crocodylus (?) *acer* Cope

MAMMALIA

INSECTIVORA

Protictops alticuspidens Peterson, gen. et sp. nov.

CARNIVORA

Hessolestes ultimus Peterson

Hyænodon sp.

*Mr. Peterson's lamented death occurred on November 12, 1933. He had no opportunity to read the proof of this paper. Editor's Note.

¹"An Introduction to Geology," William Berryman Scott, (Third Edition), Vol. II, 1932, p. 312.

RODENTIA**

Leptotomus kayi Burke
Protadjidaumo typus Burke
Mytonolagus sp.

ARTIODACTYLA

Helohyus (?)
Pentacemylus progressus Peterson
Mesagriochærus primus Peterson, gen. et sp. nov.
Diplobunops (?)
Ticholeptus?²
Poabromylus kayi Peterson
Leptomeryx minutus Peterson, sp. nov.

PERISSODACTYLA

Epihippus (*Duchesnehippus*) *intermedius* Peterson
Teleodus uintensis Peterson
Heteralestes leotanus Peterson
Epitriplopus medius Peterson, sp. nov.
Hyracodon primus Peterson, sp. nov.
Mesamynodon medius Peterson
Chalicotheres?

DESCRIPTION OF NEW MATERIAL

Order INSECTIVORA

Family LEPTICTIDÆ

***Protictops alticuspidens* gen. et sp. nov.**

Holotype: Fragment of lower jaw with M_{1-2} , roots of P_4 and M_3 . Carnegie Museum No. 11917.

Horizon: Duchesne River Oligocene, Lapoint Horizon.³

Locality: Fourteen miles west of Vernal, Utah.

Principal characters of the holotype. Trigonid relatively large and the heel small when compared with the molars of *Ictops acutidens*

**The new genera and species listed under *Rodentia* will be treated in later papers by J. J. Burke. Editor's Note.

²A fragment of a lower jaw, with P_4 and M_1 , doubtfully referred to *Ticholeptus*, in Mem. Car. Mus., Vol. XI, 1928, p. 99, and supposed to have been found in a later horizon of the Uinta Tertiary by Mr. Wm. Haslem was perhaps not found in the Uinta Basin at all.

³In the same horizon in which the Titanotheres Quarry, 11 miles west of Vernal, is located.

Douglass. The paraconid is larger and of greater functional value when compared with the latter species. In the present form, the heel

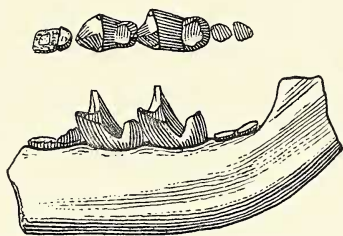


FIG. 1. *Protictops alticuspis* Peterson, gen. et sp. nov., holotype C. M. No. 11917, M_1 , M_2 and roots of P_4 and M_3 right, occlusal view, and portion of right mandibular ramus, internal view. X 4.

of the molar is of a more nearly cross-crest structure but with the median region constricted and the median tubercle very indistinct or not at all indicated, while in *Ictops acutidens* the median tubercle is well formed. The specimen pertains to an animal approximately one-half the size of *Ictops acutidens*.

An upper premolar ($?P^3$) found in the same horizon and locality in which *Protictops* was found, is associated with this series of specimens and referred to the Insectivora. It is rather doubtful that the specimen pertains to the genus proposed above, because the posterior part of the prominent protocone is more nearly of a carnassial structure and has no true tritocone as in *Ictops*. There is, however, an antero-external basal tubercle as in P^3 of *Ictops*. The deutocone is definitely formed, but basal in position and the crown is surrounded by prominent external, internal and posterior cingula.

Order ARTIODACTYLA

Family HELOHYIDÆ Marsh⁴

Helohyus (?) sp.

A fragment of a lower jaw, No. 11912, with P_4 and M_1 in position found well up in the Duchesne River Oligocene (Lapoint Horizon)

⁴There is much uncertainty regarding the systematic position of these early bunodont artiodactyls with simple lower premolars, in America. *Wasatchia* from the Big Horn Wasatch and *Lophiohyus* as well as *Helohyus* from the Bridger appear to me as of rather close relationship but I am not at present reconciled in placing *Gobiohyus orientalis* Matthew and Granger in this family, due chiefly to the advanced condition of the premolar teeth in the lower jaw of the Asiatic genus. See Amer. Mus. Novitates, No. 198, Nov. 21, 1925, p. 7.

is of considerable interest. The specimen represents a *Lophiohyus* or *Helohyus* type but is in size more nearly equal to that of *Helohyus*



FIG. 2. (?) *Helohyus* sp., C. M. No. 11912, P₄-M₁ right, occlusal view, and external view of fragment of right mandibular ramus. $\times \frac{1}{2}$.

lentus Marsh which Sinclair⁵ thinks is questionably referred to the genus *Helohyus*.

The P₄ of this specimen apparently agrees in general with the characters of *Helohyus* given by Sinclair. Thus the protoconid is high, subtrenchant with anterior and posterior vertical ridges indicated; prominent posterior cingulum-like heel and a minute antero-internal cusplule. From the posterior heel, forward to the middle of the base of the protoconid, there are well indicated cingula both external and internal; no deuteroconid. M₁ has the paraconid present which is characteristic of the genus *Helohyus*.⁶ In this specimen the posterior portion of M₁ is, however, very little, if any, wider than the trigonid. From the base of the proto- and metaconids there are low but discernible ridges which extend backward, connecting with the base of the hypoconid, thus forming a shallow, triangular-shaped pit in the median valley of the crown. Anteriorly there is a rather delicately developed cingulum, while posteriorly the cingulum is ledge-like.

That this fragmentary specimen pertains to a distinct genus is entirely probable, but I refrain from using it as a type.

MEASUREMENTS

Antero-posterior diameter of P ₄ at the base of the crown.....	16 mm.
Transverse diameter of P ₄ at the base of the crown opposite protoconid ..	9 mm.
Antero-posterior diameter of M ₁ at the base of the crown.....	13 mm.
Transverse diameter of M ₁ near posterior face.....	9 mm.
Transverse diameter of M ₁ anteriorly.....	9 mm.

⁵Bull. Amer. Mus. Nat. Hist., Vol. XXXIII, 1914, p. 283.

⁶While P₄ may easily pass as that tooth of an entelodont (*Archæotherium*), the presence of the paraconid prevents the association of this specimen with that group.

Family AGRIOCHÆRIDÆ

In the collection gathered by the Carnegie Museum field party during the season of 1932 there is no material of greater interest and importance than the fragmentary specimens of agriochærids described below. Unfortunately the feet are not represented. From the mutilated skulls and jaws, as well as limb bones, few important characters are obtained, but the detailed structure of the dentition affords nearly everything desired in the way of forms in the line to the agriochærids of the White River, John Day and other Oligocene deposits, while *Diplobunops* from the Uinta (Horizon C) previously described apparently represents a sub-family. The robustness of the premolar teeth, especially those anterior, in the latter genus, is well marked when compared with those teeth in the new material noted in the following discussion. The step towards the molarization of P_4^4 in the new material is clearly an advance beyond *Protagriochærus*, and it is certainly a great advance upon that in *Diplobunops* when the similarities in the appendicular structure in the latter genus and *Agriochærus* are considered. In other words, the appendicular structure in *Diplobunops* from the Uinta C was fully advanced along the lines of *Agriochærus* from the later Oligocene, while the cheek-teeth were far from having developed in equal ratio.

Mesagriochærus primus gen. et sp. nov.

Holotype: Greater portion of skull and lower jaws, found in articulation; fragment of lumbar vertebra; greater part of radius and ulna; fragments of pelvis and other limb bones, Carnegie Museum No. 11893.

Horizon: Duchesne River Oligocene, near base, Randlett Horizon.

Locality: Two miles east and north of Randlett Point, Uinta County, Utah.

Principal characters: I_3^3 , C_1^1 , P_4^4 , M_3^3 ; P^1 two-rooted and crown laterally compressed; P^2 similar to P^1 , but with posterior portion of crown of greater transverse diameter; P^3 with a distinct deutercone, placed well back, as well as a slight cingulum on the posterior face; P^4 with the apex of the protocone twinned and the initial step taken toward the postero-internal crescent; M^1 and M^2 with weak protoconule, while M^3 has little or no indication of such. P_1 with high, trenchant, and caniniform crown characteristic of the group; P_{2-3} with laterally compressed and simple crowns; P_4 with well-developed

deuteroconid, broad heel and the antero-internal body of the crown well-indicated. Lower molars relatively long and narrow. Limb bones slender when compared with those of *Diplobunops*. In size the animals range between that of *Protoreodon medius* and *P. parvus*.

The premaxillary is of fair proportionate size and in its alveolar border are inserted the roots of three incisors of nearly subequal size. The muzzle and facial region when compared with that of *Protoreodon*, may be considered as medium long. There is a short diastema between canine and P^1 as in *Protagriochærus*. The malar of the material under

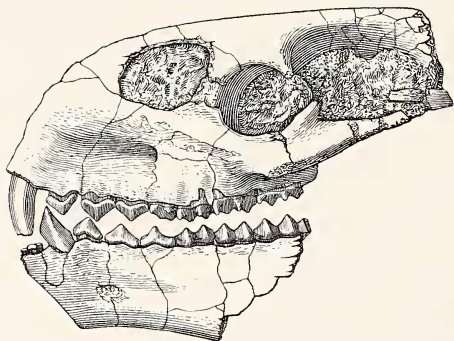


FIG. 3. *Mesagriochærus primus* Peterson, gen. et sp. nov., holotype C. M. No. 11893. Skull and lower jaw from the left side. $\times \frac{1}{2}$.

study perhaps suggests most nearly that of *Protagriochærus*; it has not the abrupt lateral expansion seen in *Agriochærus*, but the postorbital process is proportionally as robust, as is also the postorbital process of the frontal. The rather small and round orbit is, however, widely open posteriorly as in *Protagriochærus* and later forms. The height of the alveolar border of the maxillary is relatively equal to that in *Agriochærus*, and the infraorbital foramen appears to be similarly located (above P^3).

As already stated there are three incisors of approximately subequal size. The canine is well proportioned and of the characteristically D-shaped cross-section. P^1 , following the canine after a short diastema, has a simple crown, secant, laterally compressed, with an antero-posterior diameter somewhat less than in *Protagriochærus*, but relatively greater than that in *Agriochærus* in which P^1 is much reduced. The crown of P^2 is equally as sharp-pointed as that of P^1 , but it is of somewhat greater transverse diameter and has a prominent basal cingulum on the postero-internal angle, but not what can be re-

garded as a deuterocone. P^3 has a deuterocone fairly well defined, a weak antero-internal cingulum, and the indication of a vertical rib at the posterior part on the internal face of the protocone like the corresponding one in *Agriochærus* which is, however, of greater prominence in the genus of the White River Oligocene. The latter genus also has the cingulum more strongly developed on the posterior face of P^3 and therefore the initiative step towards the development of a tetartocone or posterior inner crescent is more clearly before us. The most interesting and extraordinary feature of the genus here proposed is the stage in the development of P^4 . The two distinct vertical ribs or styles on the internal face of the protocone of P^4 in *Protagriochærus*,⁷ heretofore overlooked by students, have in the present genus advanced further. In the unworn tooth the apex of the protocone has reached the twinning stage, somewhat analogous to what we find in the molars of *Deltatheroides* and *Zalamdalestes* from the Mongolian Cretaceous described by Gregory and Simpson,⁸ and referred to in later work by Gregory and Matthew. This structure of P^4 in our present specimen is so plainly evident that there can be no question as to the subsequent division of this tubercle into the proto- and tritocone, a step still further advanced in *Agriochærus minimus* Douglass from the Thompson Creek Oligocene of Montana, and completely effected in the agriochærids of the White River Oligocene of Dakota. On the posterior horn of the deuterocone crescent of P^4 in our new material there is a distinct vertical style which cannot be regarded as anything but the initial rudiment of the postero-internal crescent again slightly advanced in *Agriochærus minimus* and which though small, is completely developed in the White River forms. The antero-external style of P^4 in the present genus is of greater prominence than that in the White River representatives and suggests more closely that in *Agriochærus minimus*.

⁷In the material referred to *Protoreodon* in the Carnegie Museum, the matured specimens usually show traces of the vertical styles on the inner face of the protocone on P^4 and the apex of the protocone has sustained more or less wear. The type of *Protoreodon parvus* as illustrated by Scott (Trans. Amer. Philos. Soc., N. S., Vol. XVI, 1889, Pl. VII, fig. 1a) indicates vertical ridges on the inner face of the protocone on P^4 and the apex of the protocone slightly twinned.

⁸Amer. Mus. Novitates, 1926, No. 22, p. 11 (*Deltatheroides*); p. 14, (*Zalamdalestes*).

ADDITION, SUBTRACTION, AND DIVISION OF THE
MAMMALIAN DENTAL CUSPS

This process of division and addition of cusps on the fourth premolar in the agriochærids is of noteworthy interest in connection with the origin of the cusps on the cheek dentition of the Mammalia, so much discussed by many anatomists in the recent past and ably reviewed in Osborn's work on the "Evolution of Mammalian Molar Teeth" (The Macmillan Company, New York, 1907). In some of the *Condylarthra*, Scott has shown that the tritocone may be seen in all stages from its incipiency to a fully developed tubercle. From Osborn's studies of the *Proboscidea* we learn that the basal cingula of the teeth developed into talons, talonids and multiple crests, while in the agriochærids among the *Artiodactyla* there is apparently an extraordinary demand upon the function of a P^4 which had already, in the upper Eocene, reached the normal development usually found in the selenodont *Artiodactyla*. From the upper Eocene to the White River and John Day Oligocene we now see that this tooth yielded to form a molariform premolar unique in the suborder *Artiodactyla*. The succession of the deutocone and tetartocone of the premolars in these agriochærids apparently agrees with Scott's studies,⁹ while the tritocone was a direct result from the process of division of the protocone. The latter tubercle on P^4 thus splits in two, forming subequal proto- and tritocones. This process of splitting is somewhat analogous to that in the deutocone ridge, forming the deuto- and tetartocone in some *Perissodactyla* (e.g. *Titanotheres*), but perhaps more nearly analogous to the process in the molar dentition of *Deltatheroides* referred to above. Postero-internally the crescentic tetartocone in *Agriochærus* is, in *Mesagriochærus*, clearly an indication of a gradual development from the cingulum, which is more in line with some of the earlier conceptions of the origin of mammalian dental cusps.

Did the external tubercles of the upper molars in the ancestral agriochærids and other selenodont artiodactyls divide from a primary tubercle similar to that indicated in P^4 of the protoreodonts, including *Protagriochærus* and *Mesagriochærus*? Professor William K. Gregory, in a recent publication (Science, Jan. 13, 1933, Vol. 77, No. 1985, p. 7) definitely states that the Cretaceous insectivorous placentals of Mongolia "show an ideally primitive stage in tri-tubercular upper

⁹Proc. Acad. Nat. Sci. Philadelphia, Vol. 44, 1892, pp. 405-444.

molars and give long-looked-for paleontological proof that the primitive cusp was not on the inner side, as believed by Cope and Osborn, but was located on the main cusp, homologous with the main tip of the premolars."

Not only in *Agriochærus*, but also in the oreodonts and other selenodont artiodactyls,¹⁰ it is certain that the postero-internal crescent is similarly constructed to that in P^4 of *Agriochærus*. Thus the anterior horn of the posterior crescent cuts off the posterior horn of the anterior crescent and continues outward well beyond the median longitudinal valley.

As above stated, the protoconules of M^1 and M^2 are reduced and that of M^3 slightly indicated or entirely absent. The para- and mesostyles in our specimen are reduced in size and the cingulum between them less firmly connected when compared with *Protagriochærus* and *Diplobunops* from the upper Eocene, but the styles have not yet reached the sessile position and are not as gently rounded in shape as those in *Agriochærus*; nor does the cross-valley between para- and metacone extend as far outward as in the latter genus, especially on M^1 and M^2 . The lingual faces of the internal tubercles are also more sharply rounded than in *Agriochærus*.

The ramus of the lower jaw is deep, thin, and the symphysis is long and robust. The second and third lower incisors, with slightly expanded crowns, are yet adhering to the front of the lower jaws and the median tooth was undoubtedly present. Though incisiform, the lower canine is slightly larger than the true incisors. P_1 has the characteristically high, sharply pointed, and laterally compressed crown. There is a very slight diastema between the first and second premolars. P_2 is of relatively greater antero-posterior extent when compared with that of *Agriochærus* and is also more compressed laterally. P_3 is much like P_2 , except that it has a greater transverse diameter posteriorly. The primary tubercle, (protoconid of P_4) is well-developed and rises well above the rest of the crown; the metaconid though low, is distinctly formed, while the apex of the deutoconid cannot be said to be entirely isolated from the internal face of the protoconid as is the case in *Agriochærus*. The anterior crest of the protoconid appears to be

¹⁰Wortman has pointed out (Bull. Amer. Mus. Nat. Hist., Vol. X, 1898, p. 101) that the metaconule has taken the place of the hypocone of M^3 in *Bunomeryx* among the Homacodonts, thus apparently subtracting a functional tubercle of this tooth in earlier forms of this line.

almost as far along in its development as it is in *Agriochærus*, while postero-internally there is yet no indication of a tubercle; in *Agriochærus*, on the other hand, P_4 is completely molariform, plus the anterior crest of the tritoconid which was already developed before the quadritubercular structure of the tooth took place.

The lower molars are relatively long and narrow when compared with those in *Agriochærus*. The basal styles on the lingual face of the molars, though already indicated, are not as well developed as in the genus from the White River Oligocene. The heel of M_3 is of an equal proportionate length, but narrower than that in *Agriochærus*.

A dorsal vertebra, well back in that series, is indicated by a portion of a centrum, the arch and the neural spine. The latter is thin, like the spines of the lumbar, but tapers rapidly towards the top; the prezygapophysis is also interlocking and lumbar-like. A second vertebra is clearly from the lumbar region, judging from the zygapophysis which has the usual interlocking character with a high, thin, neural spine.

The fragments of the pelvis and limb bones found with the holotype are rather small in proportion to the skull and jaws just described. The forearm bones are of light weight and short. The body of the ischium is broadly expanded above the acetabulum. The latter is small but deep and the obturator foramen is apparently of large size. The femur is represented by two shafts which are rather light in structure. The length of the femur cannot be determined from the remains at hand.

The feet are represented by the fragments of two proximal phalanges and a complete bone of the median row. The latter is depressed (due in part to crushing), and broad, with the articulation for the terminal phalanx carried well up on the dorsal face; the articulation is, however, groove-like and not roundly elevated above the shaft of the bone as in *Agriochærus* and especially in *Diplobunops*; but rather more like that in the protoreodonts and oreodonts. Whether the shape of the ungual phalanges are agriochærid or protoreodont in structure, it is impossible to determine from the material at hand.

The anterior portion of a skull with the cheek dentition well preserved, and a mandibular ramus, Carnegie Museum No. 11904, found in the Duchesne River Oligocene, immediately below the "Asphalt Ridge Conglomerate," five miles south of Vernal, Utah, is provisionally regarded as a paratype of the above described species. According to the report by Mr. Kay, in charge of the field party, the horizon in

which the present specimen was found is approximately that in which the holotype was found, Randlett horizon. [This was a misapprehen-

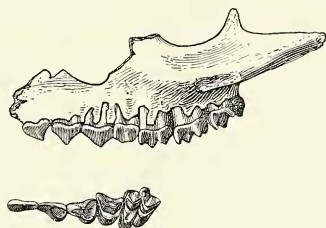


FIG. 4. *Mesagriocheerus primus* Peterson, gen. et sp. nov., paratype C. M. No. 11904, anterior portion of skull from left side and occlusal view of P¹-M¹ left. $\times \frac{1}{2}$.

sion, however. Mr. Kay considers the horizon, from which C. M. No. 11904 was taken, to be the upper part of the Halfway Horizon. (Personal communication, July 12, 1934.) J. J. Burke.] The description of the facial region and the muzzle of No. 11904, under description, was included with the description of the holotype. The noteworthy differences in the dentition of the two specimens are as follows: Premolars in No. 11904 are slightly further advanced; P² of greater transverse diameter posteriorly; P³ with a distinct vertical rib on the postero-internal face of the protocone; and the indication of the posterior inner crescent further emphasized than in the holotype described above. Furthermore M³ in 11904 has no protoconule while in the holotype there is a slight indication of such a tubercle.

The characters of the lower jaw fragment are a repetition of those already described, including the long and narrow molar series. P₃ and P₄ are closely similar to those in the holotype.

A fragment of a right ramus, No. 11903, with mutilated P₂ and P₃ and the second and third molars present, appears to belong to the species described above but gives no additional information. The specimen was found in practically the same horizon as that just described.

A third lower jaw, No. 11904A, of smaller size than those just described, and found with them, is provisionally placed with this series. The crowns of the anterior premolars are broken off but the alveolar border is complete and does not show the short diastema between P₁ and P₂ characteristic of the species just described. Judging from the size and shape of the root, P₁ is caniniform, characteristic of the group,

but the absence of a diastema back of this tooth leads me to believe that we may be dealing with a different species from that described above. The crown of P_4 is partly broken anteriorly, but from what remains I am able to judge that its development is closely similar to

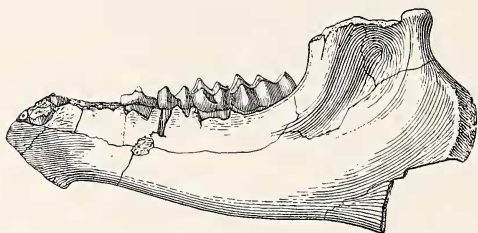


FIG. 5. *Mesagriochoerus primus* Peterson, gen. et sp. nov., C. M. No. 11904A, external view of left mandibular ramus. $\times \frac{1}{2}$.

that of P_4 in the lower jaw with the holotype already described. As in the latter specimen there is no evidence of a tubercle on the postero-internal angle. In all their detailed structure the molars are closely similar to those in the holotype.

The mandibular ramus is thin, deep, with a large angle, a correspondingly large pterygoid fossa and in all detailed structure it is similar to the ramus of the agriochoerids and the oreodonts. If the locality, five miles south of Vernal, Utah, should, after all, prove to be geologically later than that at Point Randlett, where the holotype of *Mesagriochoerus primus* was found, the three specimens, Nos. 11904, 11904A and 11903, just described, may well pertain to a distinct species. [As indicated above, Mr. Kay holds that the sediments from which these specimens were collected belong in the Halfway, the horizon immediately above the Randlett Horizon. J. J. Burke.] In comparing *Mesagriochoerus* with *Protagriochoerus* it is at once observed that the latter genus is slightly over one fifth larger,¹¹ premolars relatively larger, and P^4 not nearly as far along with regard to the indication of its molariform structure as that in *Mesagriochoerus*. While the general detailed structure of the molars is very similar, the protoconule in the species under description is considerably less developed. The two genera here compared are quite similar and it seems quite probable that *Protagriochoerus* stands ancestral to *Mesagriochoerus*.

¹¹Comparative size obtained from the respective measurements of the upper cheek-dentition.

Skull	MEASUREMENTS	No. 11893 Holotype	No. 11904 Paratype
Anterior border of orbit to premaxillary.....	72	mm.	
Postorbital process of malar to anterior alveolus of P ¹	62	mm.	58 mm.
Vertical diameter of skull opposite the orbit.....	52	mm.	48 mm.
Antero-posterior diameter of orbit.....	20	mm.	20 mm.
Vertical diameter of orbit.....	18	mm.	18 mm.
Antero-posterior diameter incisors to M ³	85*	mm.	
Antero-posterior diameter P ¹ to M ³	60*	mm.	60 mm.
Antero-posterior diameter premolar series.....	32*	mm.	30 mm.
Antero-posterior diameter of molar series.....	30*	mm.	30 mm.
Antero-posterior diameter of P ¹ at base of crown.....	7	mm.	7 mm.
Transverse diameter of P ¹ at base of crown.....	3	mm.	3 mm.
Antero-posterior diameter of P ²	8	mm.	8 mm.
Transverse diameter of P ² near posterior border.....	3	mm.	5 mm.
Antero-posterior diameter of P ³ at base of crown.....	8.5	mm.	8.5 mm.
Transverse diameter of P ³ opposite the deutocone....	6	mm.	6 mm.
Antero-posterior diameter of P ⁴	8	mm.	7 mm.
Transverse diameter of P ⁴ opposite the deutocone....	7.5	mm.	7.5 mm.
Antero-posterior diameter of M ¹	9.5	mm.	
Transverse diameter of M ¹ opposite mesostyle and posterior inner crescent.....	9.5*	mm.	10 mm.
Antero-posterior diameter of M ²	12	mm.	11 mm.
Transverse diameter of M ² , same measurement.....	12*	mm.	12 mm.
Antero-posterior diameter of M ³	13*	mm.	12 mm.
Transverse diameter of M ³ , same measurement.....	12*	mm.	11* mm.
Transverse diameter of M ³ , anterior face.....			13 mm.
Lower Jaw			
Depth of ramus at P ₄	21	mm.	21 mm.
Depth of ramus at M ₃	29*	mm.	29 mm.
Incisors to M ₃	83*	mm.	
Length P ₃ -M ₃	56	mm.	56 mm.
Length of molar dentition.....	39*	mm.	39 mm.
Antero-posterior diameter of P ₁ at base.....	7	mm.	
Transverse diameter of P ₁ at base.....	4	mm.	
Antero-posterior diameter of P ₂ at base.....	8	mm.	
Transverse diameter of P ₂	3	mm.	
Antero-posterior diameter of P ₃ at base of crown.....	9	mm.	9 mm.
Transverse diameter of P ₃	3.5	mm.	4 mm.
Antero-posterior diameter of P ₄ at base of crown.....	10	mm.	9 mm.
Transverse diameter of P ₄ opposite the deutoconid..	4.5	mm.	4.5 mm.
Antero-posterior diameter of M ₁	9	mm.	8.5 mm.
Transverse diameter of M ₁ posterior crescent.....	6	mm.	6 mm.
Antero-posterior diameter of M ₂	11*	mm.	12 mm.
Transverse diameter of M ₂	7	mm.	7 mm.
Antero-posterior diameter of M ₃			18 mm.
Transverse diameter of M ₃ posterior crescents.....			7 mm.

*Indicates approximate measurement.

Family HYPERTRAGULIDÆ

Leptomeryx (?) **minutus** sp. nov.

Holotype: Fragment of right lower jaw with P_4 , M_1 and M_2 in position, Carnegie Museum No. 11913.

Horizon: Duchesne River Oligocene; Lapoint Horizon.

Locality: North side of "Red Narrows," east of Tridell, Uinta County, Utah.

Specific characters: The apices of proto- and deutoconids of P_4 more completely separated and the postero-internal tubercle of less development than in the eastern forms, while the antero-internal body



FIG. 6. *Leptomeryx?* *minutus* Peterson, sp. nov., holotype, C. M. No. 11913. P_4 - M_2 right. $\times 4$.

of the tooth is nearly equally developed to that in other species. The molars appear to be equally hypsodont to those in the known species; the exit of the external cross-valley is also more solidly filled as in some forms of *Leptomeryx* (*L.* (?) *evansi*) and less styloform than in *Leptotragulus*, while the styloid-like cingulum on the antero-internal angle of M_2 is present as in *Leptotragulus*; absent in *Leptomeryx*. The specimen from the Duchesne River Oligocene is smaller than any hypertragulid heretofore discovered in the eastern Oligocene or in the Uinta Eocene.

MEASUREMENTS

Length P_4 - M_2	13	mm.
Length P_4	4	mm.
Transverse diameter M_1	3	mm.
Length of M_1	4	mm.
Length of M_2	4.5	mm.
Transverse diameter M_2	3	mm.

While the specimen above described appears to represent the hypertragulids it is provisionally placed in the genus *Leptomeryx*, pending the discovery of more complete material.

Order **PERISSODACTYLA**
 Family **HYRACODONTIDÆ**
 Subfamily **TRIPLOPODINÆ**

***Epitriplopus medius* sp. nov.**

Holotype: Maxillary with P³-M² represented, Carnegie Museum No. 11915.

Horizon: Base of Duchesne River Oligocene. Randlett horizon.

Locality: Two miles northeast of Randlett Point, Uinta County, Utah.

Specific characters: P³ with proto- and metalophs slightly separated on the inner face of the crown. P⁴ with proto- and metalophs well separated internally; the base of the internal exit of the cross-valley is, however, closed up, forming a large and relatively deep median

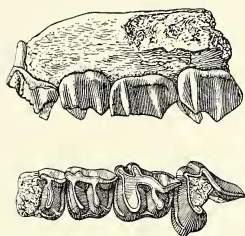


FIG. 7. *Epitriplopus medius* Peterson, sp. nov., holotype C. M. No. 11915, external view of portion of left maxillary and occlusal view of P³-M² left. $\times \frac{1}{2}$.

fossette. Furthermore, there is present on P⁴ a very weak crista and a cingulum-like ridge on the posterior half of the ectoloph. M¹ of approximately the same diameter as in *Epitriplopus uintensis*, but with a heavier internal cingulum at exit of the cross-valley. There is a well marked cingulum on the posterior half of the ectoloph on M¹, absent on M², while in *E. uintensis* there are no external cingula on the molars. M² shorter than in *E. uintensis*.

MEASUREMENTS

Length of cheek-teeth dentition P ³ -M ²	59 mm.
Length of P ³ , approximately.....	13 mm.
Transverse diameter opposite metaloph.....	12 mm.
Length of P ⁴ , ectoloph measurement.....	13 mm.
Transverse diameter P ⁴ , opposite protoloph.....	12 mm.
Length of M ¹ , ectoloph measurement.....	18 mm.
Transverse diameter of M ¹ , opposite protoloph.....	15 mm.
Length of M ² , ectoloph measurement.....	18 mm.
Transverse diameter of M ² , opposite protoloph.....	17 mm.

A mandibular ramus, C. M. No. 11916, represented by the symphysis; and a second fragment which contains the roots of P_2 and P_3 and the complete P_4 , together with other fragments of the jaw, are of considerable interest in this connection. The geological horizon is well up in the Duchesne Oligocene, approximately the same as that in which the titanotheres quarry (now referred to as the Lapoint horizon), eleven miles west of Vernal, Utah, is located. P_2 of this specimen is single rooted and very small as in *Mesamynodon medius* Peterson.¹² P_3 is of approximately the same antero-posterior diameter, while P_4 is shorter than in the latter species. This portion of the jaw is perhaps most nearly similar to that corresponding part in *Mesamynodon*, while the symphysis, if pertaining to the same specimen, is certainly not an amynodont, but most likely a triplopodine, judging from the relatively small size and round section of what remains of the canine roots.

Subfamily HYRACODONTINÆ

Hyracodon primus sp. nov.

Holotype: Fragment of maxillary with P^4 - M^3 , Carnegie Museum No. 11914.

Horizon: Duchesne River Oligocene; Lapoint Horizon.

Locality: One-half mile north of the Vernal-Lapoint road, about fourteen miles west of Vernal, Utah.

Specific characters: In detailed structure the teeth agree most closely with those in *Hyracodon petersoni* Wood,¹³ except the less

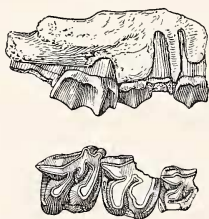


FIG. 8. *Hyracodon primus* Peterson, sp. nov., holotype C. M. No. 11914, external view of portion of right maxillary and occlusal view of P^4 - M^2 right. $\times \frac{1}{2}$.

hypsodont crowns; the more prominent external cingulum of P^4 , M^1 and M^2 ; and the greater convexity of the posterior portion of the

¹²Ann. Car. Mus., Vol. XXI, 1931, p. 71.

¹³Ann. Car. Mus., Vol. XVI, 1926, p. 315.

ectoloph on P⁴ and M¹. This convexity of M² is much reduced and more nearly approaches the concave external face of the metacone in the molars of *H. petersoni*. The crista of P⁴ and the molars are of somewhat greater development than in the White River species.

MEASUREMENTS

Length of cheek-dentition P ⁴ -M ³ , approximately.....	53 mm.
Length of P ⁴	12 mm.
Breadth of P ⁴	12 mm.
Length of M ¹ , ectoloph measurement.....	15 mm.
Breadth of M ¹ , opposite metaloph.....	15 mm.
Length of M ² , ectoloph measurement.....	17 mm.
Breadth of M ² , opposite protoloph.....	17 mm.
Breadth of M ² , opposite metaloph.....	14 mm.